



# Lipid Variations in Spawning Eulachon

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## The Issue

Each spring, hundreds of Steller sea lions (SSL) gather and cooperatively forage on the annual pre-spawn aggregation of eulachon in Berners Bay, Alaska. The eulachon serve as an abundant, energy-rich prey source at a time just prior to the SSL breeding season. Therefore, this feeding event may have a significant impact on the breeding success of SSL in the region each year.

To evaluate the energetic and nutritional value of eulachon in the SSL diet, we are attempting to:

- Assess the prey quality (energetic content) of eulachon on a seasonal and spawn cycle basis
- Characterize seasonal and spawn cycle variations in the proximate and fatty acid composition of eulachon.
- Investigate potential effects of eulachon feast on breeding success



SSL endure fasting periods as part of the breeding process, requiring energy-rich meals prior to migration to the rookeries. Adequate levels of fat intake and ingestion of Essential Fatty Acids are important for healthy pup development.

This map shows the region of southeast Alaska where the Berners Bay eulachon spawning runs occur. An estimated 8-10% of the region's SSL forage at this location during the spawning run. The eulachon analyzed in this study were collected at the indicated sites in the bay and river.

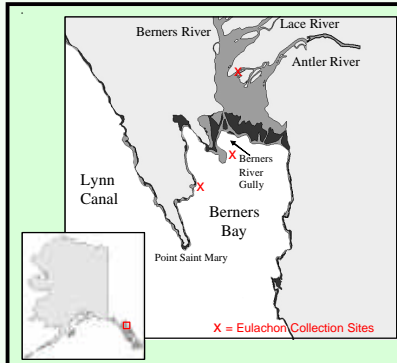
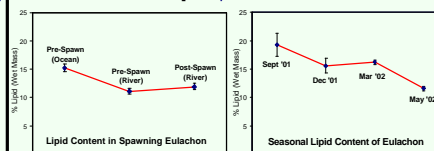
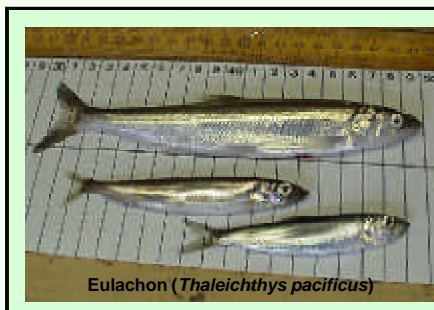


Photo Courtesy of Jamie Womble, Univ of Alaska, Fairbanks

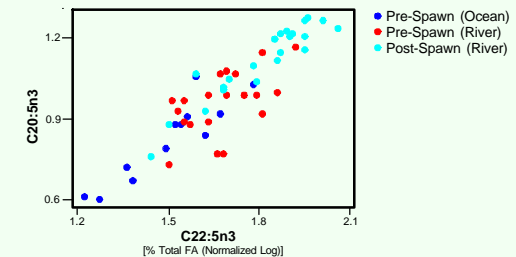
## Eulachon Lipid Content Variation



Overall lipid content in eulachon (and hence energetic value to predators) varies on a seasonal basis, with significant decreases in lipid during the spawning run. Lipid content also decreases going into winter, presumably due to reduced food availability.



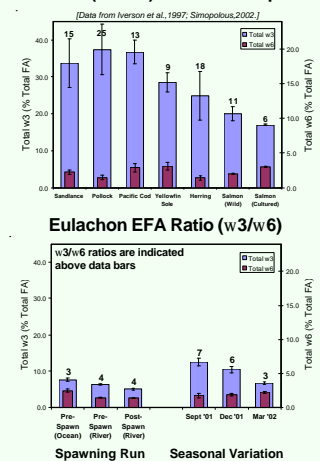
## Variation of Individual FA's During Spawning



Individual fatty acid levels of the eulachon, particularly those involved in the omega-3 EFA pathway, undergo significant changes during the spawning event.

## EFA Ratio (w3/w6) for Various Species

Compared to other SSL prey species, Eulachon is one of the lowest level dietary sources for Essential Fatty Acids (EFAs). Eulachon have very low omega-3/omega-6 (w3/w6) ratios, which vary seasonally, and are lowest during the spawning run. The low ratios are primarily due to low levels of w3 EFAs.



## Summary

Aggregated pre-spawn eulachon provide SSL with an energy-rich prey source prior to breeding, but the eulachon are near their annual energetic minima during this time. Furthermore, they are depleted of Essential Fatty Acids (EFAs), which are needed by the SSL for healthy pup development.

## References

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